We claim:

1. A process for oxidation of alkylbenzenes to produce hydroperoxides comprising:

providing an oxidation feed consisting essentially of an organic phase, said oxidation feed comprising one or more alkylbenzenes and a quantity of neutralizing base having a pH of from about 8 to about 12.5 in 1 to 10 wt.% aqueous solution, said quantity of neutralizing base being effective to neutralize at least a portion of acids formed during said oxidation, said oxidation feed comprising up to an amount of water effective to increase neutralization of acids formed during said oxidation without forming a separate aqueous phase;

exposing said oxidation feed to oxidation conditions effective to produce an oxidation product stream comprising one or more product hydroperoxides.

2. The process of claim 1 wherein said amount of water is from about 400 ppm to about 2 wt.%.

3. The process of claim 1 wherein the neutralizing base is selected from the group consisting of alkali metal bases, anhydrous ammonia, and aqueous ammonia.

4. The process of claim 2 wherein the neutralizing base is selected from the group consisting of alkali metal bases, anhydrous ammonia, and aqueous ammonia.

5. The process of claim 1 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

6. The process of claim 3 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

7. The process of claim 1 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield,

decreasing AP formation, decreasing DMBA formation, decreasing EMBA formation, decreasing phenol content, and combinations thereof.

8. The process of claim 2 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield, decreasing AP formation, decreasing DMBA formation, decreasing EMBA formation, decreasing phenol content, and combinations thereof.

9. The process of claim 6 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield, decreasing AP formation, decreasing DMBA formation, decreasing EMBA formation, decreasing phenol content, and combinations thereof.

10. The process of claim 1 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield by about 7% or more, decreasing AP formation by about 20 or more, decreasing DMBA formation by about 20% or more, decreasing EMBA formation by about 20% or more, decreasing phenol content by about 50% or more, and combinations thereof.

11. The process of claim 6 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield by about 7% or more, decreasing AP formation by about 20 or more, decreasing DMBA formation by about 20% or more, decreasing EMBA formation by about 20% or more, decreasing phenol content by about 50% or more, and combinations thereof.

12. A process for oxidation of alkylbenzenes to produce hydroperoxides comprising:

providing an oxidation feed consisting essentially of an organic phase, said oxidation feed comprising one or more alkylbenzenes and a quantity of alkali metal base, said quantity of alkali metal base being sufficient to neutralize at least a portion of acids formed during said oxidation but insufficient to cause said neutralizing base to precipitate out of solution during said oxidation, said oxidation feed comprising up to an amount of water effective to increase neutralization of acids formed during said oxidation without forming a separate aqueous phase; and,

exposing said oxidation feed to oxidation conditions effective to produce an oxidation product stream comprising one or more product hydroperoxides.

13. The process of claim 12 wherein said amount of water is from about 400 ppm to about 2 wt.%.

14. The process of claim 12 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

15. The process of claim 13 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

16. The process of claim 12 wherein said quantity of neutralizing base is sufficient to produce a molar ratio of from about 0.5:1 to about 4:1 to acids formed during said oxidation.

17. The process of claim 15 wherein said quantity of neutralizing base is sufficient to produce a molar ratio of from about 0.5:1 to about 4:1 to acids formed during said oxidation.

18. The process of claim 12 wherein said alkali metal is selected from the group consisting of sodium and potassium.

19. The process of claim 17 wherein said alkali metal is selected from the group consisting of sodium and potassium.

20. The process of claim 12 wherein said alkali metal base is selected from the group consisting of alkali metal carbonates and alkali metal bicarbonates.

21. The process of claim 19 wherein said alkali metal base is selected from the group consisting of alkali metal carbonates and alkali metal bicarbonates.

22. The process of claim 12 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield, decreasing AP formation, decreasing DMBA formation, decreasing EMBA formation, decreasing phenol content, and combinations thereof.

23. The process of claim 21 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield, decreasing AP formation, decreasing DMBA formation, decreasing EMBA formation, decreasing phenol content, and combinations thereof.

24. The process of claim 12 wherein said total hydroperoxide yield is increased by about 7% or more.

25. The process of claim 21 wherein said total hydroperoxide yield is increased by about 7% or more.

26. The process of claim 12 wherein AP formation is decreased by about 20% or more.

27. The process of claim 25 wherein AP formation is decreased by about 20% or more.

28. The process of claim 12 wherein formation of one or more of EMBA and DMBA is decreased by about 20% or more.

29. The process of claim 27 wherein formation of one or more of EMBA and DMBA is decreased by about 20% or more.

30. The process of claim 12 wherein phenol content is decreased by about 50% or more.

31. The process of claim 29 wherein phenol content is decreased by about 50% or more.

32. A process for oxidizing alkylbenzenes comprising:

providing an oxidation feed consisting essentially of an organic phase, said oxidation feed comprising one or more alkylbenzenes and a quantity of sodium carbonate, said quantity of sodium carbonate being sufficient to neutralize at least a portion of acids formed during said oxidation but insufficient to cause said sodium carbonate to precipitate out of solution during said oxidation, said oxidation feed comprising up to an amount of water effective to increase neutralization of acids formed during said oxidation without forming a separate aqueous phase; and,

exposing said oxidation feed to oxidation conditions effective to produce an oxidation product stream comprising one or more product hydroperoxides.

33. The process of claim 32 wherein said amount of water is from about 400 ppm to about 2 wt.%.

34. The process of claim 32 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

35. The process of claim 33 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

36. The process of claim 32 wherein said quantity of neutralizing base is sufficient to produce a molar ratio of from about 0.5:1 to about 4:1 to acids formed during said oxidation.

37. The process of claim 35 wherein said quantity of neutralizing base is sufficient to produce a molar ratio of from about 0.5:1 to about 4:1 to acids formed during said oxidation.

38. The process of claim 32 wherein, when compared to a control oxidation absent the quantity of

neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield, decreasing AP formation, decreasing DMBA formation, decreasing EMBA formation, decreasing phenol content, and combinations thereof.

39. The process of claim 37 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield, decreasing AP formation, decreasing DMBA formation, decreasing EMBA formation, decreasing phenol content, and combinations thereof.

40. The process of claim 32 wherein said total hydroperoxide yield is increased by about 7% or more.

41. The process of claim 37 wherein said total hydroperoxide yield is increased by about 7% or more.

42. The process of claim 32 wherein AP formation is decreased by about 20% or more.

43. The process of claim 41 wherein AP formation is decreased by about 20% or more.

44. The process of claim 32 wherein formation of one or more of EMBA and DMBA is decreased by about 20% or more.

45. The process of claim 43 wherein formation of one or more of EMBA and DMBA is decreased by about 20% or more.

46. The process of claim 32 wherein phenol content is decreased by about 50% or more.

47. The process of claim 45 wherein phenol content is decreased by about 50% or more.

48. A process for oxidizing alkylbenzenes comprising:

providing an oxidation feed consisting essentially of an organic phase, said oxidation feed comprising one or more alkylbenzenes and a quantity of ammonia, said quantity of ammonia being sufficient to neutralize at least a

portion of acids formed during oxidation but insufficient to increase production during the oxidation of materials selected from the group consisting of phenol and one or more byproducts selected from the group consisting of AP, DMBA, and EMBA, said oxidation feed comprising up to an amount of water effective to increase neutralization of acids formed during said oxidation without forming a separate aqueous phase; and,

exposing said oxidation feed to oxidation conditions effective to produce an oxidation product stream comprising one or more product hydroperoxides.

49. The process of claim 48 wherein said amount of water is from about 400 ppm to about 2 wt.%.

50. The process of claim 48 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

51. The process of claim 49 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

52. The process of claim 48 wherein said quantity of neutralizing base is sufficient to produce a molar ratio of from about 0.5:1 to about 6:1 to acids formed during said oxidation.

53. The process of claim 51 wherein said quantity of neutralizing base is sufficient to produce a molar ratio of from about 0.5:1 to about 6:1 to acids formed during said oxidation.

54. The process of claim 48 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield, decreasing AP formation, decreasing DMBA formation, decreasing EMBA formation, decreasing phenol content, and combinations thereof.

55. The process of claim 53 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to perform a function selected from the group consisting of increasing total hydroperoxide yield, decreasing AP formation, decreasing DMBA formation, decreasing EMBA formation, decreasing phenol content, and combinations thereof.

56. The process of claim 48 wherein said total hydroperoxide yield is increased by about 7% or more.

57. The process of claim 53 wherein said total hydroperoxide yield is increased by about 7% or more.

58. The process of claim 48 wherein AP formation is decreased by about 20% or more.

59. The process of claim 57 wherein AP formation is decreased by about 20% or more.

60. The process of claim 48 wherein formation of one or more of EMBA and DMBA is decreased by about 20% or more.

61. The process of claim 59 wherein formation of one or more of EMBA and DMBA is decreased by about 20% or more.

62. The process of claim 48 wherein phenol content is decreased by about 50% or more.

63. The process of claim 61 wherein phenol content is decreased by about 50% or more.

64. A process for oxidation of alkylbenzenes to produce hydroperoxides comprising:

providing an oxidation feed consisting essentially of an organic phase, said oxidation feed comprising one or more alkylbenzenes and a quantity of neutralizing base having a pH of from about 8 to about 12.5 in 1 to 10 wt.% aqueous solution;

exposing said oxidation feed to oxidation conditions effective to produce an oxidation product stream comprising one or more product hydroperoxides;

said quantity of neutralizing base being sufficient under said oxidation conditions to neutralize at least a portion of acids formed during said oxidation but insufficient to produce one or more result selected from the group consisting of causing said neutralizing base to precipitate out of solution and increasing production of one or more materials selected from the group consisting of phenol and one or more byproducts selected from the group consisting of acetophenones (AP), dimethylbenzyl alcohol (DMBA) and ethyl methyl benzyl carbinol (EMBA);

said oxidation feed comprising up to an amount of water effective to increase neutralization of acids formed during said oxidation without forming a separate aqueous phase.

65. The process of claim 64 wherein said amount of water is from about 400 ppm to about 2 wt.%.

66. The process of claim 64 wherein the neutralizing base is selected from the group consisting of alkali metal bases, anhydrous ammonia, and aqueous ammonia.

67. The process of claim 65 wherein the neutralizing base is selected from the group consisting of alkali metal bases, anhydrous ammonia, and aqueous ammonia.

68. The process of claim 64 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

69. The process of claim 67 wherein said alkylbenzenes are selected from the group consisting of cumene, s-butylbenzene, and combinations thereof.

70. The process of claim 64 wherein, when compared to a control oxidation absent the quantity of neutralizing base, the quantity of neutralizing base is effective to increase total hydroperoxide yield.

71. The process of claim 69 wherein, when compared to a control oxidation absent the quantity of

neutralizing base, the quantity of neutralizing base is effective to increase total hydroperoxide yield.

72. The process of claim 64 wherein said total hydroperoxide yield is increased by about 7% or more.

73. The process of claim 71 wherein said total hydroperoxide yield is increased by about 7% or more.

74. The process of claim 64 wherein AP formation is decreased by about 20% or more.

75. The process of claim 73 wherein AP formation is decreased by about 20% or more.

76. The process of claim 64 wherein formation of one or more of EMBA and DMBA is decreased by about 20% or more.

77. The process of claim 75 wherein formation of one or more of EMBA and DMBA is decreased by about 20% or more.

78. The process of claim 64 wherein phenol content is decreased by about 50% or more.

79. The process of claim 77 wherein phenol content is decreased by about 50% or more.